

Two New Fossil Species of *Subpterynotus* Olsson and Harbison, 1953 (Gastropoda: Muricidae: Muricopsinae) from Southern Florida

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ABSTRACT Two new species of the muricid genus *Subpterynotus* Olsson and Harbison, 1953 are named from the Neogene fossil beds of southern Florida. These include *Subpterynotus gabbi* n. sp. from the Early Pleistocene (Gelasian Age) Fort Denaud Member of the Caloosahatchee Formation, and *S. feliciae* n. sp. from the Late Pliocene (Piacenzian Age) Pinecrest Member of the Tamiami Formation. Both new species had previously been incorrectly assigned to the Langhian Miocene taxon *S. textilis* (Gabb, 1872) from the Baitoa Formation of the Dominican Republic. Another Floridian species, *S. miamiensis* Petuch, 1994 from the late Piacenzian Fruitville Member of the Tamiami Formation, is redescribed and compared to *S. gabbi*, and *S. feliciae*.

KEY WORDS *Subpterynotus*, *S. textilis*, *S. miamiensis*, *S. gabbi*, *S. feliciae*, Muricidae, Florida, Dominican Republic, Baitoa Formation, Caloosahatchee Formation, Tamiami Formation

INTRODUCTION

The genus *Subpterynotus* Olsson and Harbison, 1953 encompasses four known Neogene fossil taxa and also two living species. The extant taxa are widely distributed around the planet, being known from West Africa (*Subpterynotus exquisita* (Sowerby III, 1904)) and southern Australia (*Subpterynotus tatei* (Verco, 1895)), demonstrating that the genus probably was once far more cosmopolitan than it is today. The other four known species (two described here) are all extinct and are restricted to eastern North America, being known from only the Dominican Republic in the Caribbean and southern Florida, United States. The three Florida fossil species are among the most beautiful and distinctive muricids known from the Neogene of the southeastern United States and are highly sought after by both amateur and professional paleontologists. Surprisingly, the taxonomy of this popular and prominent group

of fossil mollusks has been in flux for over 100 years, with incorrect names being applied to the Florida species. This paper concentrates on the four known fossil species and attempts to rectify several taxonomic errors that have led to nomenclatural confusion within the literature.

SYSTEMATICS

Class Gastropoda

Subclass Sorbeoconcha

Order Prosobranchia

Infraorder Neogastropoda

Superfamily Muricoidea

Family Muricidae

Subfamily Muricopsinae

Genus *Subpterynotus* Olsson and Harbison, 1953

Subpterynotus textilis (Gabb, 1872)
(Figure 1)

Description. (Here reprinted from the original description, as *Murex* (*Pterynotus*) *textilis*): “Shell compressed, triangular; whorls eight, the

first nuclear, the next three cancellate and showing little or no trace of varices, which show themselves on the next (fifth) distinctly from the first time, suture deep, caused by the great convexity of the whorls. Body whorl broad and flat above then very convex near the top and tapering very gradually in advance. The three varices are thick at their bases, broad acute and slightly recurved in the margin. Between each pair of varices there is one large prominent node, placed longitudinally, too broad to be called a rib. The entire surface is covered with about a dozen revolving ribs, except on the faces of the varices, where corresponding grooves take their place. Crossing these, the lines of growth are developed into minute erect plates, placed at equal distances, and arching over all the ribs and intermediate, alternating lines, so as to produce under a lens, the effect of a lace or loosely woven net. Aperture small, ovate; inner lip faintly grooved internally; canal about twice as long as mouth, and nearly, or entirely arched over. Length 1.4 inches; width .8 inches.” (Gabb, 1872: 202)



Figure 1. Holotype of *Subpterynotus textilis* (Gabb, 1872), length 35.36 mm, width 20.32 mm. ANSP 3257. From the Baitoa Formation, Dominican Republic, Langhian Age of the Early Miocene. Photo courtesy of Kathryn Estes-Smargiassi.

Type Material. HOLOTYPE - length 35.36 mm (1.4 inches), width 20.32 mm (0.8 inches), Langhian Miocene of the Dominican Republic, ANSP 3257 (Academy of Natural Sciences of Philadelphia; now the Academy of Natural Sciences of Drexel University, Philadelphia).

Type Locality. Baitoa Formation of the Dominican Republic.

Age and Stratigraphic Range. The species is restricted to beds dating from the Langhian Age of the Miocene (16 million years BP).

Distribution. *Subpterynotus textilis* is now known to have ranged from the Greater Antilles to northwestern Florida during the Miocene. The holotype was collected in the Dominican Republic, but fragmentary specimens are also known from the Chipola Formation of the Florida Panhandle (E.H. Vokes, 1989).

Etymology. Named for the cloth-like appearance of the sculpture on the varical wings; “the effect of lace or loosely woven net”.

Discussion. Gabb never illustrated the type of his “*Murex (Pterynotus) textilis*”, simply publishing the description seen above and relying on workers to personally examine the holotype at the Philadelphia Academy. Because the type was not figured, Dall (1890: plate 9, figure 4) illustrated a shell from the geologically much younger, Early Pleistocene (Gelasian Age) Caloosahatchee Formation, presuming that it was the same species that Gabb had named from the Miocene of the Dominican Republic. This taxonomic mistake was carried on by subsequent workers, including Pilsbry (1921: 353, plate 28, figure 4) who was the first worker to actually illustrate Gabb’s holotype and stated that “This beautiful species is also found in the Pliocene of the Caloosahatchie River, Florida. It has been well figured by Dr. Dall.” The

Caloosahatchee Formation specimen illustrated by Dall, and referred to by Pilsbry, is here named as a new species in the following section.

The true *Subpterynotus textilis* (first illustrated by E.H. Vokes in 1989), is a smaller shell than the three Florida fossil species shown in this paper and differs from them by having a much narrower spire with distinctly acuminate and exerted early whorls and in having a stockier, more truncated shell with a proportionally shorter siphonal canal. The rib-like, intervarical knobs on *S. textilis* are also much smaller, less developed, and far less prominent than those seen on the three Plio-Pleistocene Florida species. Like the other three fossil species, the wing-like varices, are prominent and well developed, but, unlike the other species, these are almost flattened and only slightly recurved. The aperture of *S. textilis* is also proportionally much larger than the apertures of its Floridian descendant species, giving it a more inflated and broader appearance. The fragmentary specimens of *S. textilis* found in the Chipola Formation of northwestern Florida (roughly contemporaneous with the Dominican Baitoa Formation; see E.H. Vokes, 1989) compare well with Gabb's type (see Figure 1), demonstrating that the species had a wide range across the Miocene Caribbean and Floridian region. Several other Baitoa species are also known from the Chipola Formation, including *Vasum haitense* (Sowerby, I, 1850) (Turbinellidae-Vasinae), *Plochelaea crassilabrum* Gabb, 1872 (Mitridae), and *Potamides suprasulcatus* Gabb, 1872 (Potamididae).

Subpterynotus gabbi Petuch and Berschauer,
new species
(Figure 2A, B)

Description. Shell large for genus, reaching lengths of 70 mm, elongated, club-shaped, with elevated spire whorls and rounded shoulder;

suture of spire whorls deeply impressed, forming distinct channel, distinctly canaliculate; body whorl rounded and inflated, widest across shoulder area, tapering gradually to sharp anterior tip of siphonal canal; entire shell covered with dense filigree of very small, fine, curved scales, which become larger and better developed on wing-like varices; body whorl and siphonal canal fuse together without noticeable stricture; shell with 3 heavily squamous, recurved varices per whorl; posterior ends of varices project onto spire whorls, producing overlapping wings that create rose petal effect; individual varices extend anteriorly onto siphonal canal area, forming single elongated wing that runs from spire whorls to pointed tubular structure of anterior tip; intervarical areas of body whorl ornamented with single large, rounded, narrow, elongated axial rib-like knob which extends to body whorl-siphonal canal juncture; intervarical areas of body whorl with 14-16 large, squamous spiral cords; varices of siphonal canal ornamented with 12 large squamous cords and 4-6 very fine threads present between each pair of main cords; varices edged with prominent curved serrations, corresponding to primary cords; aperture proportionally large, oval.

Type Material. HOLOTYPE - length 46.7 mm, width 22.8 mm, from the Griffin Pit, Palm Beach County, Florida, deposited with LACMIP (Invertebrate Paleontology section of the Los Angeles County Museum of Natural History, Los Angeles, California) LACMIP 41974.1, LACMIP Type 14874; PARATYPES - lengths 68.0 mm and 65.3 mm, same locality as the holotype, in the research collection of the senior author; length 47.6 mm, same locality as the holotype, in the research collection of the junior author; length 41.8 mm, from the Brantley Pit, Arcadia, DeSoto County, Florida, in the research collection of the senior author.

Type Locality. Collected in the Fort Denaud Member of the Caloosahatchee Formation, in the Griffin Brother's Pit, Holey Land Wildlife Management Area, southwestern Palm Beach County, Florida.

Age and Stratigraphic Range. Restricted to beds of middle Gelasian Age, Early Pleistocene (2.2 million years BP). Known only from the Fort Denaud Member of the Caloosahatchee Formation, Okeechobee Group.

Distribution. Known only from an area of southern Florida extending from St. Petersburg, Pinellas County, south to DeSoto County, and extending southeastward to Palm Beach County.

Etymology. Named for Professor William More Gabb (1839-1878), renowned pioneer American paleontologist and geologist, whose research in the Dominican Republic, Costa Rica, Baja California, and the American West led to the publication of many classic papers and texts on molluscan paleontology. His brilliant career was tragically cut short when he died at a young age from the complications of malaria, which he had contracted while working in Costa Rica. Professor Gabb also conducted anthropological research while studying the geology of Costa Rica, which resulted in the publication of the classic ethnological text "On the Indian Tribes and Languages of Costa Rica" (1875).

Discussion. This large and distinctive species was chosen by W.H. Dall for his illustration of Gabb's "*Murex (Pterynotus) textilis*", stating that "This fine species, never adequately figured, is here illustrated from a Florida specimen collected on the Caloosahatchie [sic] by the writer" (Dall, 1890: 142, plate 9, figure 4). This mischaracterization of a Miocene shell being the same species as an Early Pleistocene one was the beginning of a series of misidentifications that have persisted up to the present day.

Besides being separated in time by over 13.8 million years, *Subpterynotus gabbi* differs considerably from its Miocene ancestor, by being a much larger, more elongated shell with much finer and more delicate spiral cord sculpture on the body whorl and varices. Proportionally, the varices on *S. gabbi* are much wider, broader, better developed, and more recurved than those on *S. textilis*, and the siphonal canal is also longer. The posterior ends of the varices of *S. gabbi* extend well onto the spire whorls, forming overlapping, petal-like curls, while those of *S. textilis* extend only onto the penultimate whorl, leaving most of the spire exposed, without strong varical sculpture. Olsson and Harbison (1953), the authors of the genus, illustrate two specimens of *S. gabbi* from the Caloosahatchee beds at St. Petersburg (as *textilis*, plate 36, figures 7 and 7A), and these records represent the northernmost locality from which the species has been collected. Comparisons of *S. gabbi* with the other two Floridian species, *S. feliciae* n. sp. and *S. miamiensis*, are given in the following sections.

Subpterynotus feliciae Petuch and Berschauer,
new species
(Figure 2C, D)

Description. Shell of average size for genus, reaching lengths of 50 mm, elongated, club-shaped, with elevated, protracted spire whorls and rounded shoulder; suture of spire whorls impressed, forming distinct channel; body whorl rounded and inflated, widest across shoulder area, tapering gradually to sharp anterior tip of siphonal canal; entire shell covered with dense filigree of very small, fine, curved scales, which become larger and better developed on wing-like varices; body whorl and siphonal canal fuse together without noticeable stricture; shell with 3 heavily squamous, recurved varices per whorl; posterior ends of varices project onto spire whorls, producing overlapping curved wings;

individual varices extend anteriorly onto siphonal canal area, forming single elongated wing that runs from spire whorls to pointed tubular structure of anterior tip; intervarical areas of body whorl ornamented with single large, rounded, narrow, elongated axial rib-like knob, which extends to body whorl-siphonal canal juncture; intervarical areas of body whorl with 12-14 large, squamous spiral cords; varices of siphonal canal ornamented with 10-12 large squamous cords and 4-6 very fine threads present between each pair of main cords; varices edged with prominent curved serrations, corresponding to primary cords; aperture proportionally large, oval.

Type Material. HOLOTYPE - length 46.6 mm, width 22.4 mm, APAC Pit, Sarasota, Sarasota County, Florida, deposited with LACMIP (Invertebrate Paleontology section of the Los Angeles County Museum of Natural History, Los Angeles, California) LACMIP 42974.1, LACMIP Type 14875; PARATYPES - lengths 54.3 mm and 49.0 mm, same locality as the holotype, in the research collection of the senior author; length 37.7 mm, same locality as the holotype, in the research collection of the junior author.

Type Locality. Collected in Unit 7 of the APAC Pit, Sarasota, Sarasota County, Florida.

Age and Stratigraphic Range. Restricted to beds of early Piacenzian Age, Late Pliocene (3.6 million years BP). Known only from the Pinecrest Member of the Tamiami Formation, Okeechobee Group (Unit 7 of the Pliocene reference section at Sarasota; see Petuch and Roberts, 2007).

Distribution. Known only from an area of southern Florida extending from Sarasota, Sarasota County, south to Naples, Collier County, and eastward to Okeechobee County.

Etymology. Named for Felicia Weisbrot Berschauer, wife of the junior author and an avid naturalist.

Discussion. Like the Pleistocene *Subpterynotus gabbi*, the Pliocene Pinecrest Member *S. feliciae* has also been referred to the taxon "*S. textilis*" in all the previous literature on southern Floridian fossil mollusks. This new species represents the oldest member of its genus in southern Florida and has only been collected from early Piacenzian beds along western Florida, from Sarasota southward. Although similar in general appearance to *S. gabbi*, the younger Caloosahatchee shell, the older, stratigraphically-lower *S. feliciae* differs in being a consistently smaller, much more slender and elongated shell with a proportionally higher, almost scalariform spire. The siphonal canal is consistently more slender and elongated and the varical wings, especially in the shoulder area, are distinctly narrower and closer to the body whorl.

Subpterynotus miamiensis Petuch, 1994
(Figure 2E)

Description. (Here reprinted from the original description): "Shell of average size for genus, club-shaped, broad across shoulder, with abrupt and noticeable constriction at juncture of body whorl and siphonal canal; 3 squamous, recurved varices per whorl; intervarical areas with one large, narrow, knoblike axial rib; intervarical areas of body whorl with 10 large, squamous spiral cords; very fine thread present between each pair of cords; siphonal canal intervarical areas with 5 large primary cords, with single secondary cord intercalated between pair of fine, threadlike tertiary cords; varices edged with curved serrations, with serrations corresponding to primary cords; aperture proportionally large, oval." (Petuch, 1994: 287-288).

Type Material. HOLOTYPE - length 42.0 mm, late Pliocene coral reef beds of Miami, UF66266 (Florida Museum of Natural History, University of Florida, Gainesville, Florida); PARATYPE - length 44.2 mm, same locality as the holotype, in the research collection of the senior author.

Type Locality. Found in construction excavations for the Lakes of the Meadows housing development, 147th and Bird Road, Miami, Dade County, Florida. The holotype and paratype were collected in fossil coral beds that were dredged during the construction of an artificial lake.

Age and Stratigraphic Range. Restricted to beds of late Piacenzian Age, Late Pliocene (2.9 million years BP). Known only from the upper beds of the Golden Gate Member (coral reef facies), Tamiami Formation (equivalent to Unit 4 of the Fruitville Member of the Tamiami Formation; see Petuch and Roberts, 2007).

Distribution. At present, known only from the type locality in Miami, Dade County, Florida.

Etymology. Named for Miami, Dade County, Florida, the type locality.

Discussion. Of the two other Floridian *Subpterynotus* species, the late Piacenzian *S. miamiensis* is most similar to the early Piacenzian *S. feliciae*, but differs in being a stockier, broader, and wider shell with a noticeably lower spire and less-elongated siphonal canal. There are fewer spiral cords on the intervarical areas and the varices are much stronger and better-developed than those seen on the older *S. feliciae*. Likewise, the large curled serrations on the edges of the varices are much stronger and more prominent than those seen on both the older *S. feliciae* and the younger *S. gabbi*, giving *S. miamiensis* a much

more ornate, rugose, and spinous appearance. These serrations are often almost totally recurved, nearly touching the surface of the adjacent body whorl. This rare late Pliocene species has only been collected in the rich fossil coral reef deposits unearthed during housing excavations in Miami and the species probably inhabited the deep fore-reef areas of the giant coralline system that bordered the southern tip of Florida at that time (see Petuch, 2004; Petuch and Roberts, 2007).

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Figure 2. *Subpterynotus* species from the Pliocene and Early Pleistocene of Southern Florida.

A, B= *Subpterynotus gabbi* Petuch and Berschauer, new species, holotype, length 46.7 mm, Griffin Brothers Pit, SW Palm Beach County, Florida (Fort Denaud Member, Caloosahatchee Formation, Gelasian Age, Early Pleistocene), LACMIP Type 14874; **C, D=** *Subpterynotus feliciae* Petuch and Berschauer, new species, holotype, length 46.6 mm, Unit 7 in the APAC Pit, Sarasota, Florida (Pinecrest Member, Tamiami Formation, Piacenzian Age, Pliocene), ventral side covered with encrusting coralline algae, LACMIP Type 14875; **E=** *Subpterynotus miamiensis* Petuch, 1994, Paratype, length 44.2 mm, Bird Road excavation, Miami, Florida (basal beds of the Golden Gate Member, Tamiami Formation, early Piacenzian Age, Pliocene).